MARINE MAMMAL COMMISSION
4340 EAST-WEST HIGHWAY, ROOM 905
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12 February 1999

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Dear Dr. Tillman:

On 15 January 1999, you forwarded for review and comment by the Marine Mammal Commission three documents regarding research and studies mandated by the International Dolphin Conservation Program Act. They were (1) Preliminary Estimates of the 1998 Dolphin Abundance for the Main Stocks of Dolphins that Interact with the Tropical Tuna Purse-seine Fishery in the Eastern Tropical Pacific Ocean; (2) a draft report by Barbara E. Curry entitled "Stress in Mammals: the Potential Influence of Fisheries-Induced Stress on Dolphins in the ETP"; and (3) a paper by Paul C. Fiedler titled "ETP Dolphin Habitat Variability." On 1 February 1999, you forwarded for Commission review and comment a contract report by Daniel Goodman titled "Decision Framework for Assessing the Status of the Eastern Tropical Pacific Dolphin Stocks." When finalized, the data, information, and analyses in these documents will provide the principal basis for the initial determination that the National Marine Fisheries Service must make by 31 March 1999 as to whether the intentional encirclement of dolphins in the eastern tropical Pacific tuna purse-seine fishery is having a significant adverse effect on any depleted dolphin stock.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, has reviewed and offers the following comments on these four documents. Overall, they are appropriately focused and very well written. The members of your staff responsible for conducting and reporting the results of the studies described in the documents should be commended for a job well done. Most of our comments relate to drafting and point out where expansion or wording changes would help to better convey relevant information to policy makers and other readers who may not have first-hand knowledge of the topic areas addressed in the documents.

Preliminary Estimates of 1998 Dolphin Abundance

This document provides an informative summary of the design and results of the first of the three annual dolphin surveys mandated by the International Dolphin Conservation Program Act of 1997. The first paragraph notes that a meeting was held at the Southwest Fisheries Science Center on 17-18 December 1997 to discuss the design of the surveys and that "[t]he participants agreed that methods similar to those used on surveys from 1986-90 should be continued on the 1998-2000 surveys, but, based on updated information about spotted and spinner dolphin distributions, that the study area should be changed slightly."

The document does not describe, or cite references describing, the survey methods that were used from 1986 to 1990. Likewise, it does not indicate or cite a reference describing the changes, and the rationale for changes, in the survey design and the study area recommended by the participants in the 17-18 December 1997 planning meeting.

The particulars and rationale for the 1998 survey design and methods used to analyze the resulting data will not be clear to policy makers and other readers not familiar with past surveys or the recommendations provided by the participants in the December 1997 planning meeting. To minimize possible doubts and questions regarding the survey design and analytical methodology, the Commission recommends that this document be expanded to provide clearer descriptions of both the survey design and the analytical methods used to generate the 1998 abundance estimates. The following specific comments may be helpful in this regard.

Page 1, par. 3: This paragraph references Figure 1 and indicates that search effort was stratified into three areas. The referenced figure is not numbered and the three strata portrayed in the figure are not labeled. Further, it is not clear why the 1,000 meter isobath was selected as the seaward boundary of the coastal stratum, or what densities were used to differentiate the core and outer strata. Likewise, it is not clear how the survey effort was allocated among the three strata. These points should be addressed in the paper providing the final 1998 abundance estimates.

Page 1, par. 4: This paragraph indicates that visual observations were conducted from dawn to dusk in sea states up to Beaufort 6. The fourth paragraph on page 2 states that "[t]he analysis used search effort and sightings that occurred in conditions of Beaufort sea state 5 or less, and with visibility of 4 km or more." There is no indication of the analyses that presumably were done to estimate the likelihood of sighting

dolphin schools of different sizes in different sea states, or the criteria that were used to decide that sighting rates in sea states up to and including Beaufort state 5 could be used to generate the estimates. If the likelihood of sighting different size schools declines as sea state as well as distance increase, and if population estimates are not corrected to account for this decline, the abundance estimates may be biased downward and cause critics to challenge their validity. To avoid such a possibility, the paper should be expanded to describe the analyses that were done and the criteria that were used to decide that sightings that occurred in Beaufort state 5 or less would be used to generate the abundance estimates.

Page 1, par. 4: The fourth sentence in this paragraph states that "[t]wo observers search with pedestal-mounted 25x150 binoculars, scanning the 180° forward of the ship." The sentence can be interpreted in several ways -- e.g., each of the observers scans the full 180° or, alternatively, the observers somehow partition the search area. This should be clarified in the final report.

Page 2, par. 1: Among other things, this paragraph indicates that the geographic distribution of sampling effort had to be adjusted because of difficulty in obtaining research clearance from a number of countries. The nature of the difficulty and the consequent changes in the tracklines are not, but should be, described.

Page 2, par. 3: This paragraph references two computer programs that were used to collate and analyze sighting and effort data. Many of the prospective readers of this report may not be familiar with these programs. Therefore, the final report should provide either appropriate references for or descriptions of these programs. The ideal might be to append to the report brief descriptions of the key features of the programs.

Page 2, par. 4: The fifth sentence in this paragraph states that "[t]o reduce heterogeneity among sampling units, effort < 50 km/day in offshore areas, and < 30 km/day in coastal areas, was combined with effort on other days close in space and time." It is not clear why this was done, or whether it would increase the possibility of double counting and thus inflate the population estimates. Additional discussion as to why and how this pooling was done would be helpful.

Tables 2-5: Readers not familiar with the Distance program will find it difficult to interpret these tables. As noted earlier, the final report should provide references for and/or

descriptions of this and the other computer programs used to generate the population estimates. Also, a legend explaining the various parameters referenced in the tables should be provided.

Figures 2-4 (detection functions): It is not completely clear how these detection functions were generated. Also, it is not clear how it would be possible to have a detection probability greater than one as appears to be the case in at least one of the sighting intervals in each of the figures. Finally, there is no obvious indication of what is meant by parameters A(1), A(2), etc.

The Potential Influence of Fisheries-Induced Stress

Among other things, the International Dolphin Conservation Program Act directs that the Service undertake a review of relevant stress-related research. This draft responds to that directive. It provides a thorough summary and well-reasoned analysis of related literature. It provides compelling support for the conclusion on page 62 that the best available data suggest that chase and capture of dolphins in the eastern tropical Pacific tuna purse-seine fishery could be having population-level effects because of stress-induced changes in the life spans and productivity of individual dolphins. It also provides a sound basis for formulating and designing programs to test hypothesis concerning indicators of stress response in dolphins subject to chase and capture in the tuna purse-seine fishery.

A copy of the draft, marked to point out a number of minor typographical errors and suggestions for clarifying certain points, is enclosed. With regard to the latter point, it appears in some cases that the draft fails to clearly differentiate between stress-related responses that are universal -- i.e., that occur in all species, age-sex groups, and individuals -- and those that may vary from individual to individual, etc. To minimize possible misunderstandings, the report should be carefully reviewed and revised to ensure that it conveys the relevant information as clearly and accurately as possible.

ETP Dolphin Habitat Variability

This document provides a useful assessment of variation over the past two or three decades of water temperature and other environmental variables that may affect the distribution of dolphin stocks in the eastern tropical Pacific Ocean. However, the rationale for some of the assessments and conclusions is not completely clear. For example, the last sentence on page 3 of

the document states "...we believe that environmental variability cannot explain apparent lack of recovery of NE offshore spotted and eastern spinner dolphin stocks since 1986."

The sentence implies, but nowhere in the document is there information indicating, that the referenced stocks have shown no signs of recovery since 1986. Also, it is not clear why 1986 was selected as the start-point for determining whether environmental variability might explain any apparent lack of recovery of depleted dolphin stocks. In this context, we note that the decision framework proposed by Dr. Goodman uses 1991 as the start-point for determining whether failure of any of the depleted stocks to grow at the expected three to four percent annual rate can be attributed to the fishery.

Also, there are a number of other variables that usefully might be examined for evidence of change in the period or periods in question. For example, tuna fishery catch and effort data, including data on bycatch, could be examined to determine whether there have been changes in principal fishing areas, number of dolphin sets, size and quantity of tuna caught, etc. in the period since 1991 that are not comparable to changes that occurred prior to 1991.

This paper, along with the others, will provide the principal basis for the initial determination that the Service must make in March as to whether the tuna purse-seine fishery is having a significant adverse effect on the recovery of depleted dolphin stocks in the eastern tropical Pacific Ocean. Many of the individuals who may read the document to assess the validity of the determination likely will be unfamiliar with the data sets and acronyms used in the paper. Therefore, it should be reviewed and expanded to ensure that the data, procedures, and assumptions used in the analysis are clearly evident.

Dr. Goodman's Proposed Decision Framework

This paper provides a succinct summary of relevant background information and lists a series of questions that will need to be addressed to determine whether there is reasonable evidence that any of the depleted dolphin stocks in the eastern tropical Pacific have failed to grow at the expected three to four percent rate since 1991 and, if there is reasonable evidence, the likelihood that the lack of expected growth is attributable to the fishery, to changes in the environment, or to other variables. It proposes and explains the rationale for three criteria to be used to decide whether any apparent failure of depleted dolphin stocks to increase at the expected rate since 1991 should be considered significant. In particular, it proposes thresholds for deciding whether any apparent suppression

of growth since 1991 should be viewed as an indication that (1) the stock may be in danger of extinction because the best estimate of the post-1991 mortality rate exceeds the best estimate of the stock's maximum intrinsic rate of growth; (2) the stock is not growing, or is growing very slowly, because the mortality rate exceeds half the maximum intrinsic rate of growth (the rate mandated to be used, by the 1994 Marine Mammal Protection Act Amendments, to calculate the potential biological removal (PBR) level for marine mammal stocks); or (3) the time it will take for the stock to recover to its maximum net productivity level will be extended substantially.

The Commission believes that the proposed criteria are both reasonable and conceptually sound. The Commission recommends that these be adopted and used as the basis for making the required initial determination as to whether chase and encirclement are having a significant adverse effect on any depleted dolphin stocks -- i.e., whether any of the depleted dolphin stocks are not growing or are growing at rates significantly less than would be expected if mortality and serious injury associated with chase and encirclement were the only impediments to population growth. The Commission also recommends that the results of this contract study be made available immediately for public review and comment so that, as the author notes, it will be possible that "future discussions will link these in a more comprehensive decision tree."

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I hope that these comments and suggestions are helpful. If you or your staff have questions about any of them, please let me know.

Sincerely,

John R. Twiss, Jr.
Executive Director

Enclosure

cc: The Honorable Rolland A. Schmitten
Ms. Hilda Diaz-Soltero